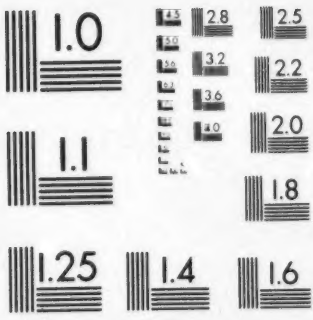

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To determine the relationship between handwriting speed and syntactic complexity, a study examined the syntactic features of 60 students enrolled in either a basic writing course or a traditional college composition course. Fast and slow handwriting were identified from highest scores on any one of four writing "tests." The writing samples collected were in response to a persuasive task since it required the most complex syntax. To ensure the complete development of ideas and strategies, students were given three prewriting activities. The collected writing samples were then analyzed for 18 direct or derived syntactic variables. Results indicated that enrollment in composition class was a significant main effect for 11 syntactic variables. Basic writers produced fewer words, fewer T-units, and fewer clauses than traditional college writers. However, the length of the T-units and clauses was not significantly different. Traditional college writers produced twice as many left-branching structures and these were twice as long as those of basic writers. They also produced almost three times as many right-branching structures. The multivariate analysis of variance for handwriting speed indicated that it was not a significant main effect for any of the 18 syntactic variables. However, traditional college writers who were also fast handwriters produced more words, more T-units, and more clauses than any of the other subjects, whether they were also traditional college writers or fast handwriters. (HOL)

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Scribal Fluency and Syntactic Fluency

(a paper presented as part of the panel "Recent Research on the Writing Behaviors of College Writers" at the Conference on College Composition and Communication, New York, New York, March 29-31, 1984)

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The scribal act, the physical act of writing, of moving the pen or pencil across the page so as to form decipherable words without great effort, is fundamental to the development of writing skills. Shaughnessy (1977), in her ground breaking book on basic writing, echoes this when she characterizes the basic writer as still struggling with the motor-mental coordinations that have long ago become unconscious for more practiced writers. As long as the mechanical processes involved in writing are themselves highly conscious, slow, or even labored, the writer is not likely to have easy access to his/her thoughts through writing.

Graves (1978), in a research review significant for its brevity, states, "It is at the point of speed that we have underestimated the contribution of handwriting to composing (p. 398)." Research with young writers shows that they compose less effectively because of the slowness of their handwriting. He calls for research that attempts to uncover the connection between handwriting and writing. Finally, he points out that there is a separate body of research on handwriting and another on writing, but only in rare instances have these two been connected.

The body of research on handwriting has been very carefully reviewed by Askov, Otto and Askov (1970), surveying the research of the 1960's, and Peck, Askov and Fairchild (1980), surveying the 1970's. Nowhere in the one hundred and forty-one studies reviewed is a direct connection between handwriting and composing examined.

The body of research on writing also has examined this connection only slightly. Nold (1981) found that for children and inexperienced writers, the burden of the motor task of forming letters may overwhelm the limited capacity of short-term memory, interfering with the more global

concerns of content and meaning. Pianko (1979) established the slower pace of basic writers. Her remedial and traditional groups produced approximately the same number of words per minute, but the traditional group paused twice as often as the remedial group. The remedial group, therefore, used a greater amount of time to physically write the same number of words. Pianko judged the remedial groups pieces as showing little concern for content, for getting the idea across to the reader. The portrait that emerges is one of a slow deliberate pace that absorbs attention, diverting it from the higher order concerns that produce pieces rich in content and ideas.

Flower and Hayes (1981), relying on insights from cognitive psychology, explain this situation as one where the task of translating ideas into visible language interferes with the more global processes of planning, generating and organizing ideas according to goals established in the given writing situation. During translating, handwriting causes a lower order disturbance in the hierarchy of concerns involved in writing; this disturbance receives an inordinate amount of limited attention resources depriving the higher order concerns of the attention needed for complete development.

In this study, we examined the relationship of handwriting speed to the syntactic complexity of the language. We tried to answer the following questions: Will the pieces produced by writers who have a slow handwriting speed be syntactically less complex than those of writers who write more quickly? Will their pieces show less embedding and branching? To write complex sentences with a variety of clausal and non-clausal modifiers, requires that a writer manipulate a number of separate linguistic bits,

translating them from ideas generated, storing one or more in full or reduced form in short-term memory as others are recorded by hand. If this very act of recording by hand requires attention, not to mention a large amount of attention, them the attention available for storage of ideas and linguistic units becomes less. The resultant syntax is less complex because the writer is unable to store those things that create complexity.

In order to examine the relationship between handwriting speed and syntactic complexity, we decided to look at the features of the syntax of writers identified as having a fast handwriting speed and of writers identified as having a slow handwriting speed. Since the literature discussed earlier would suggest that basic writers could be expected to have a slower handwriting speed and, by implication, traditional college writers could be expected to have a faster handwriting speed, subjects for the study were chosen from four sections of English 100, Basic Writing, and four sections of English 101, College Composition.

From the 152 students in these eight sections, the problem was now to identify the thirty fastest handwriters and the thirty slowest handwriters. This became more of a problem than expected because in the 141 handwriting studies reviewed by Askov, Otto and Askov and Peck, Askov and Fairchild only seven directly dealt with handwriting speed, and, in all seven, speed was a secondary concern. The handwriting speed was usually estimated by having the students copy a passage that was presented on the overhead or chalkboard. In some cases students were allowed to read the passage several times before being asked to copy it so that they would be familiar with the words.

For our purposes in this study, we wanted to estimate the students' maximum handwriting rate, and we wanted this rate to be representative

of the maximum rate they might use while actually composing. Since the handwriting research reports mentioned earlier did not have an agreed upon method for measuring handwriting rate, we decided to proceed under the following guideline--the maximum handwriting speed should be estimated in a situation that comes close to composing but that does not call for actual composing and its additional complexities. With this guideline in mind, we decided on four different ways to elicit the students' maximum speed. The student's handwriting rate would be the highest score on any one of the four tests.

The first test was based on Kellogg Hunt's "Aluminum" passage, a paragraph of short sentences about the making of aluminum. Students were directed to first combine the short sentences into larger sentences without omitting any ideas, the standard "aluminum" test procedure. They were then asked to copy the new combined paragraph and raise their hand when finished. When the first student finished, all students were asked to stop, spreading them on a continuum of completion. We decided to use this "aluminum" test procedure because of our guideline of coming as close as possible to real composing. Here we reasoned that the student would be copying a passage that was cast in syntax that was individually representative of the writer just as in normal composing. The student would also be very familiar with the passage, having just combined it. None of the eventually identified thirty fast handwriters and thirty slow handwriters scored their highest rate on this test, so it was not considered further.

After the "aluminum" test procedure, we then asked students to write out from memory the Pledge of Allegiance. We first had two student volunteers recite it, and, next led the whole class in recitation. They then wrote the Pledge from memory, again, being asked to stop when the

first person finished. With this test we reasoned that the writer was familiar with the material and that he/she would be transferring something from the mind to paper and not copying from a source. Both of these made this activity more like real composing. Of the sixty students in the eventual sample, three scored their highest rate on this test.

Next we asked the students to copy the Star Spangled Banner which was printed at the top of a dittoed sheet. We then asked them to re-copy it as fast as they could. Here, again, all were asked to stop when the first person finished. We reasoned that students were familiar with the material, and, since they copied it first at what might be called the normal rate, they were also familiar with the scribal requirements of the passage. This again seemed close to the situation of normal composing. Of the sixty subjects, forty-one scored their highest rates on the speeded copying and sixteen on the normal copying, these sixteen sensing that speed was important or writing normally at a very fast rate.

To ensure that students didn't write at breakneck speed producing handwriting that was illegible, for all four tests we asked them to always write legibly enough so that at least they could read it. Again, we felt this was the standard of legibility for actual composing. Also, all four tests were timed until the first person was finished. Then the total letters produced in each test situation were counted and divided by the time to produce a rate score in letters per minute. A student's highest score on any of the four tests was the score used to identify the thirty fastest and thirty slowest handwriters.

Within a week of the approximately thirty-five minutes needed to administer these four tests, we returned to the class for two consecutive

class periods to supervise the collection of a writing sample from each student. We asked students to write in response to a persuasive task because research shows that this mode requires the most complex syntax. First, we asked them to read the task and do a five minute freewriting focused on it. Then we asked them to share their freewriting in small groups, supplementing their freewriting with any notes from the discussion that seemed useful. Finally, we had a full class discussion about the task and writing about it. These three activities were intended as pre-writing activity because, since we were going to collect only one piece of writing, we wanted to ensure that students were able to develop their ideas and strategies as completely as possible. We then gave the students the rest of that first class and all of the second to write and revise a piece.

The writing of the thirty fastest and thirty slowest handwriters was tnen analyzed for eighteen direct or derived syntactic variables. Two graduate assistants did the analysis, analyzing half of the papers and then analyzing an additional ten percent of the other graduate assistant's papers. I analyzed a randomly selected quarter of all the papers so that we then had three-way checks on the reliability of the analysis. The reliability coefficients ranged from .99 to .94.

The first thing we learned from the results of the analysis was that our assumption that basic writers would be characterized by a slower handwriting speed was false. Half of the thirty fastest handwriters were basic writers. We were also surprised to find that almost half, thirteen of thirty, of the slowest handwriters were traditional college writers. We began to investigate handwriting speed because we wanted to learn more about basic writers, but we actually ended up investigating a behavior that

characterizes writers across the board. What we originally saw as a 1 x 2 design with speed as the main effect now changed to a 2 x 2, speed and class as the main effects.

Results of the syntactic analysis indicated that class was a significant main effect for eleven of the eighteen syntactic variables. Basic writers produced significantly fewer words, significantly fewer T-units and significantly fewer clauses than traditional college writers. However, the length of their T-units and clauses, as calculated by words per T-unit and words per clause, were not significantly different. Neither was the number of clauses per T-unit, the subordination ratio. It would seem then that basic writers simply write fewer T-units, but these T-units are just as long and contain subordinate clauses of the same length and at the same frequency as traditional college writers. Basic writers in this study, as has been observed frequently, showed a striking lack of overall written fluency. At this point in the analysis, it appeared that basic writers and traditional writers write the same type of T-unit, the basic writers just writing fewer of them. Further analysis of the structure of their T-units indicated that this was far from the truth.

Very significant differences in the structure of their T-units were noted when we examined the three free modifier positions, left-branched, medial embedded and right-branched. Traditional college writers produced twice as many left-branching structures, and these structures were almost twice as long as those of basic writers. Traditional college writers also produced almost three times as many right-branching structures, these structures were three and one-half times as long as those of basic writers, and they made up a significantly higher percentage of the total words

in the piece. These strikingly significant differences demonstrate that basic writers and traditional writers write decidedly different types of T-units, especially in the right-branching position, a position established as characteristic of mature complex syntax.

The differences in the syntactic patterns of basic writers and traditional college writers were frequent and striking, but what of handwriting speed, the main effect that we originally set out to investigate. The multivariate analysis of variance for handwriting speed indicated that it was not a significant main effect for any of the eighteen syntactic variables. However, handwriting speed did approach significance as a main effect for total words (.07), total T-units (.09) and number of right-branching free modifiers (.09). This fact coupled with what looked like some interesting patterns among the cell means led us to use post hoc Helmert mean contrasts to see if these patterns were statistically significant.

The cell means for total words, total T-units and total clauses showed the same statistically significant pattern, namely, traditional college writers who were also fast handwriters produced more words, more T-units and more clauses than any of the other subjects whether they were also traditional college writers or fast handwriters. These traditional/fast writers also produced significantly more words in left-branching structures and significantly more right-branching structures and words in right-branching structures. In fact, traditional college writers who were also fast handwriters finished higher on fourteen of eighteen measures when compared to traditional college writers who were slow handwriters, although the difference was significant only for the six measures just mentioned. This same pattern, an advantage to the fast handwriter,

was also present in the basic writers for fourteen of the eighteen variables, although none of the differences reached statistical significance.

In closing, let me summarize in two areas, one theoretical and one instructional. First, theoretical. This study lends significant support to the body of research that describes the differences in syntax of basic and traditional college writers, confirming previous research that indicated differences in overall fluency and differences in the use of left and right-branching structures. This research also makes a first attempt to clarify the speculations about how handwriting speed is related to composing, supplying at least some evidence that there is an advantage to having a fast handwriting speed, for traditional college writers for sure and quite possibly for basic writers. Finally, instructionally, this study would imply that we teachers of writing should encourage our traditional college writers to write rapidly when they draft their pieces. Encouraging this scribal fluency has been advised for basic writers, but this study concludes with empirical support for also recommending this to traditional college writers. Scribal fluency seems to allow for a maximizing of syntactic fluency, and it is, therefore, something we should encourage in all our students.

TABLE I

Marginal and Cell Means by Class and Speed for Total Words, Total T-Units, Total Clauses, Words per T-Unit, Words per Clause and Clauses per T-Unit

		CLASS		
		100	101	
SPEED	SLOW	180.18	296.62	230.63
		13.88	21.08	17.00
		21.00	33.23	26.30
		13.42	14.36	13.83
		8.87	9.02	8.94
		1.54	1.60	1.57
	FAST	211.40	361.87	286.63
		16.53	25.67	21.10
		29.93	40.13	32.03
		13.12	14.62	13.87
		8.99	9.40	9.20
		1.47	1.57	1.52
		194.81	331.57	
		15.13	23.54	
		22.38	36.93	
		13.28	14.50	
		8.93	9.23	
		1.51	1.59	

TABLE 2

Marginal and Cell Means by Class and Speed for Number of Left-Branched Structures, Words in Left-Branched Structures, Number of Right-Branched Structures, Number of Medial Embeddings, and Words Medially Embedded

		CLASS		
		100	101	
SPEED	Slow	2.94	6.00	4.27
		13.65	26.23	19.10
		.41	.61	.50
		2.00	4.85	3.23
		.06	.31	.17
		.29	2.85	1.40
	Fast	3.07	5.20	4.13
		16.13	27.87	22.00
		.46	1.73	1.10
		2.60	12.53	7.57
		.27	.40	.33
		1.13	2.93	2.03
		3.00	5.57	
		14.81	27.11	
		.44	1.21	
		2.28	8.96	
		.16	.36	
		.69	2.89	

TABLE 3

Marginal and Cell Means by Class and Speed for Total Free Modifiers, Words in Free Modifiers, Percent of Words in Free Modifiers, Percent of Words in Left-Branching Structures, Percent of Words in Right-Branching Structures and Percent of Words Medially Embedded

		CLASS		
		100	101	
SPEED	SLOW	3.41 15.94 8% 7% 1% 0%	6.92 33.92 12% 9% 2% 1%	4.93 23.73 10% 8% 1% 0%
	FAST	3.80 19.87 9% 7% 1% 1%	7.33 43.33 13% 8% 4% 1%	5.57 31.60 11% 8% 2% 1%
		3.59 17.78 8% 7% 1% 0%	7.14 38.96 12% 9% 3% 1%	